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WHAT MAKES A GAME 'EDUCATIONAL'?

An interview study about teachers' perceptions of educational games and game based learning

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Abstract

The discourse of educational games and game based learning is comprised of a diverse cluster of arguments, expressed by commercial actors, researchers and educators. This thesis has explored how teachers relate to the discourse of arguments surrounding educational games and game based learning, with a focus on what teachers consider to be 'educational' regarding games and what they view as meaningful usage of games in educational settings.

Twelve teachers in the Swedish school system, ranging from preschool teachers to upper secondary school teachers, were interviewed. They were encouraged to approach educational games and game based learning from their perspectives and personal experiences. The interviewees' answers were interpreted using a qualitative content analysis, and the results reported in the form of thematically organized chapters, to highlight similarities and differences in their arguments.

The arguments expressed were analyzed from a game design perspective, to uncover how teachers reason in regard to what importance the design has for games' ability to lead to meaningful learning.

The findings suggest that teachers perceive the boundary between what can be considered educational and non-educational games as indistinct and fuzzy. The teachers rarely see that the design of a game can make it more or less suitable for learning purposes. Instead, how games are used by a teacher during a lesson is regarded as more important than what specific games are used and how such games are designed. The findings also confirm that the interviewees carry many of the arguments and perspectives that are commonly expressed in the popular discourse that surrounds educational games and game based learning.

Key words: Game based learning, educational game, game design, interview study, qualitative content analysis

Table of Contents

1. Introduction

There are plenty of games that claim to be educational, in the sense that people who play them are supposed to learn something while playing. Some digital games are designed for educational purposes, such as seeking to improve players' logical thinking, problem solving or other cognitive skills. Such games can also be designed with a younger audience of players in mind, typically with the intention of improving their skills in spelling and mathematics (Egenfeldt-Nielsen, 2006, p. 186). Commercial digital educational games tend to be marketed by arguments claiming that players learn while playing, while at the same time having fun.

Digital games designed purely for entertainment reasons are often referred to as Commercial off the shelf (COTS) games. Some COTS games are considered to have educational qualities that can lead to meaningful learning outcomes, despite being designed for no educational purposes (see Van Eck, 2009; Charsky & Mims, 2008). Not only digital games are considered to be suitable to play for learning purposes. Some classic board games and card games are also regarded to hold qualities for learning. Chess in particular has spawned a movement in several countries, where organizations and players advocate that Chess should be played more in school, based on arguments that it improves logical thinking and various types of mathematical skills. Such arguments tend to be promoted in documents found on websites of Chess organizations (see McDonald, 2005).

The evidence of the learning efficacy of playing games and using them in school is being questioned by research (see Boyle et al. 2016; Hainey, Connolly, Boyle, Wilson & Razak, 2016). As Selwyn (2015) points out, arguments surrounding the benefits of any form of educational technology, including games, tend to be expressed by actors that have commercial interests in the ed-tech industry. Hence, a cluster of diverse arguments comprises the discourse surrounding educational games and game based learning (GBL). It is far from clear what the educational qualities of games are. This means that teachers have to relate to a multitude of voices when considering how they are to professionally make sense of GBL. As Berg Marklund (2015) points out, teachers are a crucial part of the system that surrounds the development and use of educational games.

Understanding how teachers perceive the 'educational' part of using games in teaching will reveal which arguments regarding the educational potential of games are picked up by them. Therefore, the focus of this thesis is on exploring what teachers consider being 'educational' with games and what they view as meaningful usage of games in educational settings. The words teachers use to describe their views and arguments, through interviews, is the object of study. Their words are analyzed and discussed from a game design perspective, in the sense that games contain features in their design that constitute how they function, to better understand how teachers evaluate what importance the design of games has for their educational qualities.

2. Purpose and research questions

The purpose of this thesis is to explore how teachers evaluate any potential educational qualities in games, in order to better understand what they regard as educational games and meaningful usage of games in a classroom context.

Research questions:

- What design features make a game ‘educational’, according to teachers?
- What design features in games are important for learning purposes, according to teachers?
- What is meaningful educational usage of games in classrooms, according to teachers?
- What problems and challenges do teachers express in regard to using games for learning purposes?

3. Background

The evidence for the efficacy of GBL is rather weak, based on large scale literature reviews in the field (Boyle et al. 2016; Hainey et al. 2016). Yet, the popular discourse surrounding GBL tends to contain claims of how useful games in general – and digital games in particular – are for learning purposes. Some argue that more games should be implemented in school due to the educational benefits it would provide, and some argue that digital games possess the potential to revolutionize and transform education (see Shaffer, Halverson, Squire & Gee, 2005). Two influential debaters in particular have argued and advocated for the potential of digital game based learning during a long period of time, namely Marc Prensky and James Paul Gee.

Prensky's book *Digital Game-Based Learning* (2001) had an impact on the discussion of GBL upon its release, and has had that even to this day. He strongly advocates that education should be centered more around games and digital media, replacing the traditional teaching methods of school. He claims that the coming generations, which he calls digital natives, have a different way of thinking compared to earlier generations. He argues that children’s daily exposure to digital games in their free time from the 1980's and onwards has affected their brains to the degree that they have a hard time learning by reading books. Instead they would learn better in other ways, for instance by playing digital games (Prensky, 2001, p. 35-61). James Paul Gee's book *What video games have to teach us about learning and literacy* (2003) also affected the view on digital games’ role in education upon its release. In it, he argues that well designed video games are good environments for learning, in the sense that games teach players how to play them and provide players with enjoyable challenges to overcome. Ideally, school could learn how to create better environments for learning by taking ideas from video game design.

Their ideas that digital games possess a strong potential for learning, almost to the degree that it can revolutionize education, have resulted in both praise and criticism from other scholars and educators (see Linderoth, 2012; Thomas, 2011). Their ideas are still a strong notion in the contemporary debate about GBL and educational games, over a decade after they were written. The popular discourse surrounding GBL is however mainly concerned about digital games, while the idea of using games precedes the digital era by far.

Different kinds of games have been used in educational situations throughout history, although mainly for military training. Some of the oldest known examples date back to the Roman Empire, where military commanders used a form of sand table with icons to represent soldiers on a battlefield. That made it possible for the commanders to visualize different military scenarios and thereby discuss various tactics to use in real combats (Smith, 2009). Apart from military training, variants of games have also been used in school to teach different subjects, long before modern digital games came to be. For instance, at the end of the 19th century, board games and puzzle games started to become more commonly used in England to teach mathematics (Avedon & Sutton-Smith, 1971, p. 315-321).

The history of how games have been used in education tends to be omitted in the popular discourse surrounding GBL. Sharp (2011) argues that it is a common myth that just digital games are most suitable as educational games. Yet, GBL is heavily associated with digital games in Sweden and in several other countries, where arguments similar to those of Prensky and Gee can be found in the contemporary debate about GBL. Recurring opinions are that digital games should be used more in school, and that teachers should incorporate features from games in their lessons. Five examples of such arguments published online during recent years are presented in this chapter. The first example is a blog post from a blog titled "Spelläraren", which in English means "The Gaming Teacher." The author of the blog post, who is a teacher with a strong interest in games, writes:

> In order to reach out to today's students and to make them embrace the knowledge teachers provide them with, we need new and exciting ways of teaching. If we look at a really good game and its ability to entertain, in which players constantly crave for more, the school of today have a lot to learn from such games. How can we as teachers use the stimulation for learning? Is it even possible? (Gyllenstig Serrao, 2013, my translation).

In a news article published in the paper "NyTeknik", the head executive of the schools in Gislaved municipality in Sweden argues that personnel working in school needs to harness the educational potential in games:

> He sees great value in using games in education, especially for students in need of extra support. He believes that students can feel safe in games.
>
> - Few teachers can capture students' attention as efficiently as a well-designed game. We who work in school need to harness that power, but it requires both creativity and courage from the teachers, he says. (Alpman, 2012, my translation).

The third example comes from a blog called "Skolbloggen", which in English means "The School Blog." It is run by a primary school teacher with over 30 years of experience working as a teacher. In a blog post titled "10 reasons for game based learning", the author discusses GBL and gamification:

> Playing games is a great motivation for many students. Games motivate almost all children so by using game based learning we can reach even more students.
>
> 1. Make students participate.
> 2. Allow for a second chance - and a third.
> 3. Give immediate feedback.
> 4. Make the progression visible.
> 5. Create challenges and missions.
> 6. Give a voice and choices to students.

7. Offer badges and rewards.
8. Allow students to create a system for rewards.
9. Use technology in a pedagogical way.
10. Allow mistakes, encourage practice.

> Even though some criticize game based learning, it is incontestable that gamification give students and teachers a new and innovative way to ease the learning. Gamification has the ability to transform the classroom so students can learn practical skills, encourage cooperation and creativity, and motivate students' own learning through self-directed education. (Kulle, 2014, my translation).

The fourth example is from an online article about gamification and GBL in school, published in the magazine Horisonten.io. In the article, a teacher interviews an IT-consultant about the future of education. The latter criticizes the conservative structure of school, where traditional teaching materials are used and students have to sit and listen to a teacher. Instead it is argued that integrating games into school can be one way to create a more interesting, meaningful and relevant form of education that suits the modern world:

> Take the best parts from games and add them to school, or in other words - to use game design thinking and apply the motivational factors from games and let them be a part of learning situations. It means that school days would be designed based on playfulness, continuous relevant feedback, where you as a student have control. Learning does not have to look like a game or be a game. It is about applying the design – that in games which motivate players to keep on making progress, to take the next step. It is about creating learning situations that awake every individual's inner motivation, to reach a state, to create a flow, where time and space disappear. (Andersson, 2016, my translation).

The idea that school should use digital games for learning purposes has reached political levels. Karl Sigfrid, who at the time was a member of the Swedish parliament representing the Moderate Party, wrote a debate article in which he argues that games should be used more in school:

> The most recent Pisa-surveys show that the Swedish school system is declining, especially in comparison to Asian countries such as Japan, Singapore and South Korea. The traditional solutions to the problem – earlier grades, more time for teaching and larger economic resources – can surely do some good, but the large possibilities reside in the technological development. Not to mention that in computer games is a potential, provided that school learn to take advantage of them in education.
>
> A prerequisite for student success in school is the will to succeed. The willingness to embrace new knowledge depends on the right incitements, and in that area computer game developers are perhaps the best experts. Skilled game developers have the ability to create motivation that makes players willing to continue playing and make progress. […] Given that computer games have existed since the 1970's, it is strange that they are still almost completely absent in school. (SVD, 2014, my translation).

As these five examples intend to illustrate, there seems to exist a view among some debaters that there is a form of educational power in digital games that school should learn to use, which would generate great educational benefits. To put this into a historical perspective, new technologies tend to generate positive praise from educators. Both radio and motion pictures, in the form of cinema and later in the form of film, were expected to revolutionize education. Peterson (2014, p. 198-200) describes how the rhetoric tends to

remain the same every time new technologies are developed and made accessible, where the debate is dominated by optimistic claims from enthusiasts who see great educational potential and expect great benefits for learning. It has happened several times before in history and it is currently happening in regard to digital games, she argues. It should be noted that there are also voices in the contemporary debate about GBL that express skeptical views or have other expectations regarding the learning outcomes games can lead to when used for educational purposes in school. For instance, Linderoth (2014) discusses several approaches regarding how to practically use GBL in educational settings, based on what he considers as realistic learning goals. He argues that a problem with the overly optimistic claims regarding the educational potential of games is that they tend to contain a large dose of wishful thinking, which tends to overshadow any serious discussions on the matter. Linderoth (2014) writes:

> Educators, companies and organizations that want to benefit from new pedagogical ideas, enthusiasts and self-proclaimed experts ascribe digital games an almost magical potential that can change the conditions of learning in school. Unfortunately, the discussion of games and learning often lose grips with reality, and some debaters tend to confuse the discussion by making unfounded claims about the possibilities of games. (p. 172, my translation).

Peterson (2014) argues that scholarly material can also contain unsupported claims and enthusiastic arguments:

> In published texts, one often finds an uncritical acceptance for the possibilities of learning in games. A lot of the arguments that are presented also lack support in empiric research. To independently and critically examine educational arguments for digital technologies, such as digital games, is therefore extraordinarily important for teachers. Not the least in order to determine which arguments are scientifically based. (p. 197, my translation).

If we are to understand the contemporary state of GBL, as well as any future educational potential games might have, it is important to study teachers since they are the ones making the decision if, how and why games should be used in classrooms. Their perspectives on games are what primarily matters, when it comes to deciding on what specific games to use and how to practically implement them in school. It is therefore important to explore how teachers reason about educational games, both in terms of what they regard as important educational qualities in games, but also what they view as meaningful educational usage of games in classrooms. In the long run this type of knowledge might help to unfold what views and arguments about educational games are predominant among teachers. Although this thesis will not be able to provide a full picture of this, it might still be a small contribution to the field.

4. Games as characteristics – a theoretical approach

The theoretical framework in this thesis is based on a game design perspective, in the sense that games can be viewed as being constituted by smaller components in the design that together affect how they function, how they are played, and how they are experienced by players.

This chapter is divided into four sub-chapters, where the first sub-chapter contains a discussion of how games and educational games are defined. The second sub-chapter contains definitions of game design terms that are used to approach games from a design perspective. In the third sub-chapter, the terms *game based learning* and *gamification* are defined and discussed. The fourth sub-chapter discusses educational games in relation to learning theories.

4.1 Definitions of games

Game scholars and game designers have attempted to define and describe what a game is, but every definition seems to have its exceptions. *Games* is a tremendously broad term and there are countless variants of games, where many of them border to other areas such as sport and play. Salen and Zimmerman (2004) discuss various definitions of games, whereof one of them reads: “A game is a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome.” (p. 80). This definition has exceptions – there are games that are considered to be games even though they do not meet the criteria. For instance, there are games that do not result in any outcome, and there are games that could be argued to contain no form of conflict. Another definition in Salen and Zimmerman (2004) reads: “A game is an activity among two or more independent decision-makers seeking to achieve their objectives in some limiting context." (p. 74). There are exceptions to this definition as well - some games contain no decision making at all, nor any goals for players to achieve. There are even discussions among game scholars if games need to have players at all, in order to be defined as games (Björk & Juul, 2012).

Instead of finding the exact and most accurate definition, one can do a comparison between games and related subjects, such as play, to identify some general similarities and differences. Heath (2014, p. 77-78) defines games in relation to child's play. He argues that play and games share many similarities, but one key difference is that games contain rules, often organized in some form of system that players need to agree with in order to play. Child's play on the other hand does not require any rules at all, although there can still be rules but they are negotiable and can be changed by the participants while playing. That is seldom the case when playing games.

It can be argued that games tend to be associated with entertainment, in the sense that people play games in order to have a good time. Therefore, commercial games are typically designed with the intention of providing players with a joyful and entertaining experience. As a contrast to this, some games are designed with other purposes in mind, apart from being fun to play. Such games are sometimes classified as *serious games* (see Breuer & Bente, 2010, p. 16-18). One type of serious game is *educational games*, which means that they are designed with the intention of teaching players something, rather than just being entertaining to play. However, *educational games* can also refer to games that have been designed purely for entertainment reasons but are used for educational purposes.

A set of fixed rules, that together make up some kind of system players can engage with, can be viewed as a fundamental aspect of games. But as this chapter intends to illustrate, finding an exact and universal definition of what games and educational games are, is hard. It is difficult to precisely determine what is a game and what is not a game. Therefore, the terms *game* and *educational game* are treated generously throughout this thesis, which is especially prominent in the result section in chapter 7, where teachers have described and discussed games from their perspective.

4.2 Characteristics in games

Game scholars and game designers use many different terms for the same concepts when referring to specific aspects of games. Four concepts are discussed in this chapter, namely *design feature*, *characteristic*, *game mechanic* and *game element*. It should be stressed that there is no unity among game scholars and game designers on what to call these concepts, nor are there any clear cut definitions of them that are used in a consistent manner. How design feature, characteristic, game mechanic and game element relate to each other and are used throughout this thesis is explained in this chapter.

It can be said that games contain a set of design features, like building blocks, that together dictate what games are about and how they are played. One type of design feature present in all games is rules, which basically is the essence of games. Rules can vary between games, but essentially they govern what players are allowed to do, as well as regulate different events, such as how players win or lose. As an example of this, the game board in Chess is divided by squares and players are only allowed to move one piece each per turn, as dictated by the rules (Heath, 2014, p. 77-78; Linderoth, 2014, p. 175-176).

Another type of design features in games is the theme, which is what a game is about, typically represented by the visual appearance of the game components, graphics, aesthetics, sounds, or in the story. The theme can vary greatly between games, and the same game can even have different themes. As an example, imagine the board game Monopoly. In its most classic appearance, the theme in Monopoly is to buy and sell property and hotels. But other variants of Monopoly exist with different themes as well, such as Dogopoly or Wineopoly, where the theme of the game is centered around dogs and wine instead of hotels. Regardless of the theme, the rules of Monopoly are still the same, meaning that players for instance still win and lose in a similar way. (Heath, 2014, p. 77-78; Linderoth, 2014, p. 175-176).

Modifying the rules or the theme in a game can create a completely different experience for players, although rules in particular are what dictate how games work. Elias, Garfield and Gutschera (2012) describe a vast variety of characteristics in games that are dictated by rules. Fundamental characteristics, such as how long it takes to complete a game, how long players have to wait before they get a chance to perform their next action in a game, or how many players can play, are rule based elements in the design that contribute to the functionality of a game. Similarly, what causes a game to end and what determines if players are winners or losers is a form of crucial characteristic of games.

Other types of characteristics can be present or completely absent in different games. One such characteristic is *hidden information*, in the sense how rules ensure what information players have access to. In Chess, players have full information throughout the game, while in many card games players keep their cards hidden from each other. Depending on how the rules dictate what information players have access to, completely different gaming experiences can be created. Similarly, the amount of *randomness* in a game, the *available choices* players have, the ways players are able to interact with each other, the *set of skills* required by players to participate in a game, can be seen as characteristics since they are dictated by rules. Some characteristics may not be obvious at a first glance when looking at a game's design. For instance, the degree of *complexity* in a game, or the possibilities players have to *catch-up* and win when they are behind or losing in a game, may become apparent after playing. Still, they can be seen as characteristics since they are determined by how the rules are designed. In essence, games contain a bundle of vastly different types of characteristics, each one dictated by design features, in the form of rules.

If characteristics, as determined by rules, are seen as the major ingredient in games, the concept of game mechanic can rather be viewed as the engine that makes games function. Björk, Lundgren and Holopainen (2003) have attempted to map and categorize game mechanics into so called design patterns, as a way to create a framework of commonly used mechanics in games. As an example of a game mechanic, they write (p. 182): “A typical mechanic is ‘roll and move’ that simply states that dice are rolled and that something

else is moved related to the outcome of the die roll." This particular example is mainly relating to board games, where players roll dice and then move a certain piece on the game board. The act of rolling a dice and moving a piece is a mechanic that can be found in various variants in many different games.

In its core, game mechanics are a set of rules that tend to be of extra importance when keeping a game going. Mechanics can greatly affect how players experience a certain game, both from an emotional and intellectual point of view. As an example, Björk, Lundgren and Holopainen (2003, p. 186) describe a mechanic called *triangularity*, which refers to the situation where three different objects in a game can beat each other. The most famous game that uses this mechanic is probably *Rock paper scissors*, in which players simultaneously reveal their hands. Rock beats scissors, scissor beats paper, paper beats rock. It could be argued that this kind of game mechanic affects players in an emotional way by creating tension and surprise. This mechanic alone might not lead to much intellectual stimulation in *Rock paper scissors*, since there is a huge degree of randomness involved. Players can basically not do much more strategic thinking than trying to predict what the opponent will choose, which essentially is a form of guessing.

The fourth and final concept that is discussed in this chapter is game element. Game elements can be said to relate to how players experience, perceive and interact with a game within the context it is played. For instance, *control* can be referred to as a game element, meaning the possibilities players feel that they have when they make decisions and act within a game. The amount of control players have in a game is dictated by characteristics and game mechanics, in the form of rules. It should be stressed that game element is an elusive concept that is treated very broadly in game design literature and in academic papers about gaming. Different types of game elements blend together and are not always clearly separated from each other. Game elements are also referred to by other terms, such as game attributes. In an attempt to grasp the diversity of the concept, Bedwell, Pavlas, Heyne, Lazzara and Salas (2012) have collected and classified game elements into a taxonomy, based on earlier researchers' work and by the help of game designers. They describe nine overarching categories that are present in essentially all types of games, and especially in educational games, to various degrees. A summary of their nine categories of game elements follows here:

- *Action Language* – How players are able to interact with a game system and perform the actions that they desire. Language in this meaning refers to how players are able to make their intentions clear to a game system, by communicating what they want to do. This category is mostly relevant to digital games, where it typically means how the interface looks like and what happens when players click to make a particular action in the game world.
- *Assessment* – How a game provides feedback to players. It can be feedback in the sense of measurement of achievement, meaning that a game informs players of what they have achieved so far. It can also be feedback in the form of information of players' progress, as a way for a game to inform them of how close they are to reaching a goal.
- *Conflict/Challenge* – How problems and challenges are designed in games, in terms of being meaningful, surprising and difficult enough, so players experience them as interesting challenges.
- *Control* – How players are able to influence a game via their own actions and decisions. A game with limited control gives few options or meaningless options to players, while a game with a high degree of control allows them to influence the game in satisfying and interesting ways.
- *Environment* – The location in which the game takes place. In regard to digital games, the fictional environment is typically constituted by the visual appearance. Other types of games use a physical environment in which players act with their bodies, or rely more on players' imagination.
- *Game Fiction* – How a game world is represented to players, providing some context for a game, typically in the sense of a visual theme or a story.

- *Human Interaction* – How players are able to interact with each other in games, in terms of social interaction. Some games encourage human interaction between the players, while other games contain none of it.
- *Immersion* – How players perceive and respond to game fiction. This is a broad term that contain several smaller elements that together may help to create a sense of immersion for players. The first element is *representation*, meaning how players perceive themselves in relation to a game world. The second one is *sensory stimuli*, which refers to how the visuals and the audio in a game contribute to creating immersion. The third element is *pieces and players*, meaning how other people or objects in a game help to create a sense of immersion. The fourth and final element is *safety*, which means that players need to feel safe in a game without fearing any real world consequences if they fail.
- *Rules/Goals* – How clear the rules and the goal of a game are for players. The rules provide boundaries and guidelines for players, and the goal provides players with reasons for acting in a game world.

Several of the listed game elements recur in other research papers about educational games, where they tend to be discussed in relation to learning effects. As an example of how these concepts are used, Arnold, Koehler and Greenhalgh (2016) write in regard to immersion: "The immersion afforded by effective educational games has implications for the engagement and the learning that students experience. Higher levels of immersion are likely to make students more engaged in their learning, which can then lead to greater learning gains." (p. 7).

As a summary, games can be approached from the perspective that they contain smaller components in the design, that together constitute how games are played and experienced. Four concepts are commonly used among game scholars and game designers when referring to the fundamental parts of games, namely *design feature*, *characteristic*, *game mechanic* and *game element*. These concepts refer to essentially every aspect of a game's design, from the rules and the theme to the story and to how it can evoke emotions and experiences in players. The term *design feature* is used throughout this thesis when referring to any detailed aspect in a game's design.

4.3 Game based learning and gamification

Game based learning is a term that refers to playing games for the purpose of learning (Plass, Homer & Kinzer, 2015, p. 259). Players should preferably learn about a specific subject or develop a certain skill through the act of playing and engaging with a game. Egenfeldt-Nielsen (2006) argues:

> We have to be careful not to confuse learning how to play video games and accidentally learning from video games with a targeted educational effort of video games. […] The educational use of video games is characteristic in that the learning experience has a specific goal. (p. 186).

Richard Van Eck (2006, p. 5-8) describes three broad approaches of how GBL tends to be incorporated in educational settings. The first approach is to let students build and play their own games, based on specific school subjects. The learning is intended to mainly occur while the students construct the game, rather than while playing. The second approach is to use educational games that are designed to teach players about a specific content. The third approach is to use COTS games and plan learning activities based on them. Although such games seldom have a learning purpose in their design, learning intends to occur through the activities that teachers plan in conjunction with them.

Gamification is described by Deterding, Dixon, Khaled, and Nacke (2011) as using elements from game design in non-game situations to create certain types of experiences, typically playful experiences. For

instance, one way to use gamification in a classroom could be to transform an activity during a lesson into a contest between two teams of students, as a way to increase their motivation. In this case, a game element in the form of rules is used to turn the school activity into a potentially joyful experience. Plass, Homer and Kinzer (2015) provides an illustration of how *game based learning* and *gamification* can be distinguished from each other:

> Consider as an example the gamification of math homework, which may involve giving learners points and stars for the completion of existing activities that they consider boring. Game-based learning of the same math topic, on the other hand, even though it may also include points and stars, would involve redesigning the homework activities, using artificial conflict and rules of play, to make them more interesting and engaging. (p. 259).

In this example, using elements from game design (rules for giving points and stars as a reward) and applying them in a non-game activity (doing homework) could help to transform it into a more enjoyable experience. This act of gamification would however not transform the homework into an actual game. The homework would just have some added features from games to potentially make the activity more playful. If the homework was rearranged into a game, with specific rules to follow, then engaging with the "homework game" would rather be considered GBL. Deterding et al. (2011, p. 6) argue that a problem with the concept of gamification is that it can be hard to determine when an activity has been gamified to the degree that it is to be regarded as a game.

4.4 Educational games in relation to learning theories

Educational games can be designed and used in educational settings based on certain ideas of how learning occur. Egenfeldt-Nielsen (2006) describes how educational video games relate to four theories of learning, namely *behaviorism*, *cognitivism*, *constructionism* and *the sociocultural approach*. The four learning theories are described briefly, followed by a short description of how educational games relate to each of them.

Learning, from the behaviorist perspective, is centered on observable behavior changes, rather than on the internal process of the mind, such as thought or reflection. Learning is presumed to occur by repetition and reinforcement of stimuli and response. Changes in behavior can be an indication of learning (see Skinner, 1968; Skinner, 1974). Educational games that are based on behaviorist principles of learning contain tasks of repetition that result in some form of reward, as an extrinsic way to motivate players. For instance, digital math games tend to contain tasks where players repeatedly solve math problems and receive a reward each time they answer correctly (Egenfeldt-Nielsen, 2006, p. 190-194).

The cognitivist approach to learning centers on learners' cognitive abilities, assuming that they construct inner representations while learning, called schemata. Schemata can be replaced or restructured in the light of new information, resulting in learning being made. Educational games based on the cognitivist perspective of learning are attempting to present information in ways that are suitable for the human mind to process, in order to reconstruct existing schemata or create new ones. Ideally should an enjoyable game experience and the learning process be intertwined so players feel intrinsic motivation to continue playing, preferably resulting in learning being made. Egenfeldt-Nielsen (2006, p. 195) writes: "These titles often aim to have elements of discovery and inquiry presenting meaningful learning experiences so that the player can construct his/her own representations in an active dialogue with the game."

The constructionist view of learning shares certain assumptions about learning with the cognitivist approach, particularly in the sense that learners construct their knowledge. From a constructionist viewpoint, learning is assumed to happen most efficiently when learners actively create objects and solve problems (see Papert,

1980). Educational games that are based on this view of learning tend to contain open game worlds where players are free to explore and engage with material in the game. Such games are sometimes referred to as microworlds. The learning goal of playing and engaging with games of that kind is not necessarily to learn about a specific subject, but rather to develop and strengthen general cognitive skills, such as creativity, memory and problem solving (Egenfeldt-Nielsen, 2006, p. 197-199).

The sociocultural perspective of learning emphasizes the surrounding social context for human learning. In this view, a central aspect of learning is the social interaction between humans, where the assistance of others is a way to develop new skills and knowledge. Egenfeldt-Nielsen (2006, p. 199) writes: "Learning occurs when a teacher, parent, peer, or tool guides a student from an actual point of development to a potential point of development." Based on this perspective, the activities that surround educational games lead to learning, rather than the games themselves. In educational settings, the discussion and reflection among students and teachers about the game experience is typically regarded as the learning activity.

5. Literature review

This literature review consists of studies in which researchers have investigated teachers' perceptions of educational games and GBL. Four themes reoccur throughout several research papers: 1) teachers' attitudes towards games, in terms of how they relate to ideas of using games in school for educational purposes, 2) what teachers consider as advantages and disadvantages of using games for learning purposes, 3) what teachers consider as barriers of implementing games in classrooms 4) teachers' opinions about the usefulness of games, in the sense of what they view as good games and good usage of games in school. Each theme is presented and discussed subsequently, one theme at a time, together with relevant research papers that relate to that theme.

5.1 Studies on teachers' attitudes towards games

Can and Cagiltay (2006) used a mixed methods approach to explore attitudes about video games among teachers in Turkey. 116 teachers were given a survey that asked them to relate to different questions and statements regarding video games, e.g. is playing games a waste of time, can games be effective for learning etc. Although the study captured a broad array of teachers' attitudes and opinions towards games by using the survey, the qualitative method – in the form of interviews - was used on a smaller number of teachers as a way to delve deeper into their reasoning. The results reveal that teachers have a very positive attitude towards using video games in school, to the degree that video games in some sense were seen as better than traditional teaching methods. In particular, video games were seen as useful for improving students' creativity, imagination, and visualization skills, as well as improving their computer related skills and knowledge. Additionally, video games encourage students to discover and investigate, resulting in learning by doing. Although there was a positive praise of video games, some teachers expressed concerns, especially in the sense that there is a risk that students do not learn anything at all while playing.

Koh, Kin, Wadhwa and Lim (2012) explored teachers' attitudes towards GBL, such as whether they have a positive approach towards games and if and how they expect games to contribute to any learning when used in school. In total, 482 teachers in all sectors of the school system in Singapore were interviewed via a survey, where they both had to answer questions via a 1-5 scale but also by writing comments. The data was used to get a glimpse of what attitudes teachers express, as well as what factors affect their attitudes. The results indicated that teachers overall have a positive attitude, in the sense that they believed games could be great to incorporate in education, especially for improving student's cognitive and psychomotor skills. Among the factors that affected teachers' attitudes, their personal interest in games seemed to play a huge

role, as well as the support they found in policies from educational authorities.

In Wastiau, Kearney and Van den Berghe (2009), over 500 teachers were interviewed in several European countries, in an attempt to map their attitudes towards GBL. The results indicated that there is a large and positive interest among the teachers, where 80% of the interviewed teachers expressed that they were curious and wanted to know more on how to incorporate educational games in their own classrooms. Teachers' expectations of what games can achieve were also of a positive nature, where they believed that games could be a way to increase the motivation of students, help them reach their educational goals, and develop collaboration and social skills.

5.2 Studies on teachers' views on advantages and disadvantages of using games

In Pastore and Falvo (2010), a survey was used to collect data from 98 American teachers, by allowing them to respond to statements and questions about games. One area of the survey was about advantages and disadvantages of games, where the results indicated that teachers viewed motivation and cooperation as two strong benefits of using games for learning purposes. On the downside, teachers feared that games could cause distraction in classrooms among students, and students may focus too much on playing so they miss what they are supposed to learn, which was therefore reported as negative aspects of GBL.

The emphasis on motivation and cooperation as benefits of games could be found in other studies as well, for instance in Razak, Connolly and Hainey (2012). The researchers explored how primary school teachers in Scotland view different aspects of GBL, by using a survey to collect answers. In regard to advantages of games, the results display that a vast majority of the participants think games can be a great way to transform a learning activity into a motivating and fun experience. Additionally, using games can be a good way to encourage collaborative learning and problem solving.

Bakar, Inal and Cagiltay (2006) used a qualitative approach where teachers were free to express their thoughts in a written form. Teachers considered computer games useful for increasing students' motivation, to enhance students' cognitive skills - such as problem solving and decision making - and also to improve students' skills in team work. A wide array of disadvantages of games were described, where the main disadvantage was that games could cause students to lose focus on the learning, resulting in no relevant learning taking place.

5.3 Studies on teachers' views on barriers

Lean, Moizer, Towler and Abbey (2006) have investigated how British university teachers use games and simulations as part of their teaching practices, as well as what they experience as potential barriers that prevent them from using games. The research approach was of quantitative nature, where questionnaires were used to collect 158 participants' opinions on different types of possible barriers, by grading them from a scale of 1 to 5. The researchers predefined what types of barriers to investigate, which were related to factors in the university environment, qualities in games and simulations, and the teacher's own abilities and knowledge of games. The results indicated that the main barrier was that teachers viewed simulations and games as risky activities that may not achieve the learning effects they have in mind. Therefore, they tended to not use them.

Baek (2008) used such a mixed-methods approach to explore what hinders teachers in South Korea from implementing games in their classrooms. 35 elementary school and upper secondary school teachers were interviewed. The results indicated that the inflexibility of the curriculum was seen as the main barrier, in the sense that teachers had a hard time using games while following the curriculum. Apart from that, teachers described a difficulty in finding appropriate games to use, as well as a lack of time and resources to construct teaching sessions based on them. In a more recent study, Watson and Yang (2016) used a quite similar

approach to examine what hinders American teachers in all sectors of the school system from using games for educational purposes in school, where 109 teachers were interviewed. The results indicated that the teachers found it challenging to find appropriate games, implement them and use the required technology, especially in a way that fit with the educational system.

5.4 Studies on teachers' views on the usefulness of games

Studies related to this theme are about teachers' views of the usefulness of games, in the sense of what they regard as good games and good usage of games in school. Studies of this kind tend to contain more of a practical approach, where teachers that participate are asked to play and evaluate specific games, and then share their opinions and ideas about them.

Sardone and Devlin-Scherer (2009) invited 25 American teacher candidates to play and explore a number of digital educational games. Their opinions were collected through surveys and interviews, with the purpose of giving insight into how the teacher candidates reason about games in educational settings. Certain games were seen as more suitable than others to use for learning purposes. Praised games were those that contained a serious content in terms of story and theme, as well as games that provided immediate feedback to players. Games that were hard to understand how to control and lacked in instructions were discarded.

Kelly, Stetson and Gratch (2010) provided teachers with the task to use a specific digital educational game together with their students, to see what they could learn about the water cycle. Both the teachers and the students were then able to share their thoughts and ideas about the learning session overall and the game in particular. The results indicated that the teachers regarded it as a useful way of both reinforcing what students already knew and as a way to introduce new concepts to them. Although studies related to this theme tend to have the focus on teachers' views and opinions on specific games, there are also studies that contain a more general approach towards GBL. In Ruggiero (2013), teachers were asked to share their plans and ideas on how to use educational games in meaningful ways, as well as explain what they regarded as good usage of games in classrooms. In total, 1704 American teachers were interviewed via a survey, which resulted in a very broad spectrum of opinions and perspectives on GBL. The results indicated that games should ideally be used as a reward for students who have finished their work, as a way to introduce new concepts or topics, and mainly for students with special needs.

5.5 Conclusion

As the literature review indicates, teachers in various countries seem to have a positive and curious attitude towards GBL. Games are generally regarded as useful to incorporate in school, especially for increasing motivation, introduce new concepts, and to develop cognitive and social abilities, such as problem solving and teamwork, among students. Regardless of the positive praise, teachers also express that it can be hard to actually use games themselves, partly due to limitations in the school system and the curriculum, as well as issues with technology.

Studies that explore teachers' perspectives on games tend to focus on digital games in the form of video games or computer games. Card games, board games or other forms of non-digital games are rarely included. Additionally, games and GBL in a broader sense tend to be the object of study, where teachers' attitudes towards games are explored and reported in a large scale, compiling hundreds of participants' answers into statistics. This thesis is mainly attempting to explore how teachers evaluate what importance the design of games has for their educational potential and usefulness in school, by digging deeper into the reasoning of a dozen teachers.

6. Methodology

This chapter contains an explanation of how the research was conducted in this thesis. It begins with a discussion of the research methodology chosen, followed by a presentation of how the research process was carried out.

6.1 Choosing a research methodology

The characteristics of qualitative and quantitative methods are explained briefly, followed by a discussion of the research methodology chosen for this thesis.

Quantitative research methods mostly revolve around measurement and quantifiable amounts. Simply put, the usage of numbers, numerical data or statistics are typical traits of quantitative research (Trost, p. 9, 2005). For instance, in regard to social science, it can mean measuring how frequently a phenomenon appears, or how it is connected to other variables. Widerberg (2002, p. 15) provides an example of this, using the phenomena of being tired. A quantitative research approach towards tiredness would be to measure how often people claim to feel tired, alternatively compare tiredness to other variables, such as age, gender, or work.

Qualitative research methods are geared towards questions where the answer is non-quantifiable, such as understanding meaning, opinions or experiences. The objects of study can be in any area in which the researcher can derive meaning, such as words, pictures or human actions. Studying these objects can be done in various ways, for instance by observation, by interviews, or by analyzing written text and pictures (Widerberg, 2002, p. 15-18). To reconnect to the example provided by Widerberg (2002, p. 15), attempting to understand the phenomena of tiredness by using a qualitative method could be to seek out what it means to people, how they experience and describe it.

A qualitative research approach was chosen for this thesis because the focus was to explore what teachers perceive as educational with games and how they account for their views. Using open-ended interviews as the main method seemed to be a useful way for acquiring rich, spontaneous and nuanced answers from the teachers. It would allow the interviewees to develop their answers more freely, compared to if they for example would answer a questionnaire. However, the results will not be generalizable to teachers as a whole, nor will they answer how many teachers in general have similar thoughts or arguments regarding games. Instead the results will hopefully be able to show that certain perspectives on games and learning exist among teachers.

6.2 Finding interviewees

Teachers in all sectors of the school system were invited by a letter to participate in the study. The invitation letter contained details about the topic of the interview, namely educational games and GBL. Those willing to participate in an interview would be asked to share their thoughts and opinions about educational games and GBL. The letter also explained that their answers would be used as data in this master thesis as well as in a forthcoming co-authored research article. Anyone willing to participate in an interview would be rewarded with a free museum ticket.

The letter was sent out to principals and head executives of schools in municipalities in the regions of Västra Götaland, Bohuslän and Halland in Sweden, with a request to spread the letter to their teachers. The response was overall positive and nearly 15 teachers responded, expressing their interest of being interviewed. However, only eight of them participated in an interview, while the rest withdrew their requests. Many of them stated time constraints as the reason for their withdrawal. The aim was to find at least ten respondents,

to ensure that teachers from all school sectors were included. The same letter was therefore sent again to more schools, as well as posted in a group on Facebook. This generated nearly 15 additional teachers who were willing to be interviewed, whereof four of them actually participated. All in all, twelve teachers were interviewed.

6.3 Presentation of the interviewees

The names of all twelve interviewees have been disguised in order to ensure their anonymity. For that reason, there is a very brief presentation of them here:

1. August	Upper secondary school teacher in Social Sciences
2. Adrian	Upper secondary school teacher in English and Social Sciences
3. Cornelia	Upper secondary school teacher in Swedish and French
4. Kajsa	Upper secondary school teacher in Swedish
5. Isola	Preschool teacher
6. Kicki	Preschool teacher
7. Lennart	Preschool teacher
8. Liv	Preschool teacher
9. Mårten	Preschool teacher
10. Ann-Katrin	Preschool teacher
11. Anette	Primary school teacher in Mathematics and Swedish
12. Jon	Primary school teacher in Mathematics and Sloyd

The teachers were not required to have used games in their own practice as teachers in order to be eligible to participate in an interview. Regardless, ten of the twelve interviewees stated that they had used games in their classrooms for educational reasons. Additionally, eight of the twelve interviewees reported that they had a strong personal interest in playing games. Most of the interviewees had worked as teachers for several years, whereof some of them had even been in the profession for over three decades. A few interviewees had recently graduated as teachers and were new in the profession.

6.4 Interview guide

The interview guide used during the interviews was constructed mainly based on the advice provided by Trost (2005, p. 50-53). He suggests that a qualitative interview guide shall contain a set of topics, each one consisting of a couple of major questions, at most. To have a list of detailed questions that are strictly asked in the same order in each interview is not recommended. Instead, the interviewer shall be aware that interviews can go in different directions depending on the answers. It is therefore important to be responsive and ask questions in an order that feels natural for the interviewee, as well as ask spontaneous questions that arise in the moment (Trost, 2005, p. 34).

Kvale and Brinkmann (2014, p. 172-179) argue that a good question should be short and easy to understand for the interviewee, and at the same time be useful for gathering relevant material for the study. Preferably the questions should allow open-ended answers in order for the interviewees to have room to answer thoroughly. They recommend nine different types of questions one can use when structuring the interview guide, for instance warm-up questions to establish a comfortable atmosphere. Their advice was also used when constructing the questions in the interview guide. The interview guide is attached as appendix 1.

6.5 How the interviews were conducted

No interview questions were given to the interviewees beforehand. However, a few of them requested to know more about the topic and the questions. Therefore, they were sent a short summary of what subject areas the interview would cover.

All twelve interviews were conducted by me and an interviewee at a time, thus resulting in twelve unique interview situations. All of the interviews were done online using Skype for communication. A couple of the interviewees preferred to use a webcam to display their faces and facial expressions during the call. I only used the microphone throughout all the interviews, as did the majority of the interviewees, as if it were a phone call.

The shortest interview was completed in 25 minutes and the longest interview took 55 minutes to complete. In general, the interviews lasted roughly 30 minutes each. The language used for communication in all interviews was Swedish. The audio was recorded with a computer. Video was not recorded from the interviews even though video was used during some of the interviews.

All in all, the interviews were quite different from each other in terms of content. Games is a broad field that the interviewees were encouraged to approach from their perspective. This generated answers and follow-up questions that made many interviews depart into unprepared and unpredicted directions.

6.6 Ethics

The Swedish research council recommends a list of principles researchers should follow when gathering data from people via interviews or other methods (Vetenskapsrådet, 2002).

First of all, the interviewees shall be informed about the conditions of their participation in a research project. This includes that they shall be informed what the research project is all about, that their answers will be used as data, that they will be anonymous, and that they are free to cancel their participation whenever they desire, without suffering any consequences.

Secondly, the researcher shall respect the promises given and ensure the safety of the interviewees. This includes to only use the recorded material for the intended purpose, such as a research project. Furthermore, the researcher shall respect the interviewees right to be anonymous and not break the professional secrecy by sharing the material in careless ways, especially not when handling sensitive information. Trost (2005, p. 103) argues that no research in the world is so important that it allows a researcher to break the professional secrecy, especially if that could result in danger for the interviewee. At the beginning of each interview, the interviewees were informed about the ethical principles:

- The interview will be recorded and all your answers can be used as data in the research project.
- You and your answers will be anonymous. Nothing you say can be traced to you as a person.
- You have the right to cancel the interview at any time, even after the interview is finished. If you request that I remove your answers from the research project I will do so, until this thesis is published.

After all the interviews were finished and the transcription completed, the names of the interviewees were modified in all quotes that are used in this thesis. Information that could help to identify them was also modified or removed, such as names of schools they work at or have worked at, or how many students they have in their classes.

6.7 Transcribing the interviews

All the recorded interviews were transcribed from audio to text by me. According to Trost (2005, p. 125-127) there are no predefined rules or conventions in qualitative research one can follow when transcribing interviews from audio to text. Rather, the researcher needs to be creative and do it in a way that fits for his or her particular work, as well as being transparent with the process. Kvale and Brinkmann (2014, p. 220-221) argue in a similar fashion by stating that there are few conventions to follow, except one rule – decide how to do it and describe the process in a clear way.

As a remainder, the aim of this thesis is to explore what teachers consider to be educational with games, by looking at what arguments and perspectives they express. It therefore seemed unnecessary to accurately transcribe every utterance spoken by the interviewees. Neither were sounds such as humming, laughter, pauses or other noises included in the transcription. Instead, the colloquial language was converted into written text, which means that many sentences were reformulated. This was done for two reasons:

First, to ensure better readability for the readers. Kvale and Brinkmann (2014, p. 217-218) argue that colloquial language typically seems odd in written form. Therefore, it can be wise to adapt the language when converting recorded material into text so it becomes readable. After all, it is unavoidable to lose nuances of audio material when converting it to text. The intonation of the voices, gestures, and other parts of a verbal conversation will always get lost when written down.

Secondly, due to respect for the interviewees Trost (2005, p. 134-135) argues that it is unethical to transcribe recorded colloquial language into text form literally, meaning that every word is written down exactly as how it was said in the interview. This can easily give an impression to readers that the interviewees are stupid and speak in an incoherent way.

The most important aspect of the transcription process was to ensure that the meaning of the interviewees' answers remained intact when converting from colloquial language into text. Sentences were compressed by removing unnecessary words that I evaluated as unimportant for their arguments. In some cases, sentences were reformulated completely, mainly when they were incoherent and consisted of repeated words. All interviews were transcribed from start to finish. Lastly, all quotes from the interviews that are present in this thesis were translated from Swedish to English, to ensure that readers who do not understand Swedish would still be able to evaluate and judge the included quotations.

6.8 Coding the material

A method called qualitative content analysis was used for coding and organizing the transcribed interview material in this thesis. According to Mayring (2014, p. 39-41), qualitative content analysis needs to be adjusted and customized to fit with the specific research questions and source material that is unique for every study. It is not a static analytical instrument that always remains the same. Central to the qualitative content analysis is the categorization system. In order to conduct a systematic analysis, one has to define and organize a set of categories that together are used as the analytical instrument on the source material. Preferably it should be so clearly defined that another researcher shall be able to carry out the analysis in a similar way on the same material, by using the same categorization system, and thus reach a similar result.

There are several approaches one can take when constructing the categories. The approach used in this thesis is called Inductive Category Formation, which is described by Mayring (2014, p. 79-87) in a series of steps. The first step is to formulate a preliminary definition of the categories, depending on what type of research questions one wants to attempt to answer. In the second step, these categories are used when reading through the text material, sentence by sentence. Material that fits into the categories is collected. All relevant material will likely not fit into the categories, which requires that the researcher defines additional categories or sub-categories as a way to ensure that the material is precisely categorized. Lastly, when a full set of categories

has been defined, the whole material is re-read again to ensure that everything relevant has been categorized. Four major categories were predefined in this thesis:

- What makes a game educational?
- What games are suitable to use for learning purposes?
- What is seen as meaningful usage of games in education?
- What are the disadvantages and problems of using games in education?

All source material, in the form of transcribed interviews, was read thoroughly. Each sentence that seemed to fit into any of the four categories was underlined with a colored marker. After the first reading, additional sub-categories were required to cover all of the material. In total, 11 sub-categories were constructed and the material was added to them. After the second read-through, all of the material had been categorized into these sub-categories.

This approach seemed to fit well with the data collection method used in this thesis, namely open-ended interviews. Sometimes the relevant content could be spread throughout an interview since the conversation could take other directions than originally planned by the interviewer. Using this approach to construct categories, both beforehand but also while reading through the material, was a valuable way of organizing the relevant material, which resulted in the themes that are described in the result section, in chapter 7.

A framework of the constructed categories is attached as appendix 2.

6.9 Credibility of the results

In this section, the concepts of reliability and validity are discussed, especially how they relate to qualitative research methods in general and to this thesis in particular.

A short explanation of what the concepts mean is required in order to get this discussion started. Based on how Trost (2005, p. 111-115) defines reliability and validity, both concepts can shortly be described in the following way:

- Reliability refers to how well a method produces similar results, if used again by the same or other researchers under the same conditions. Therefore, a study has a high degree of reliability if the method used in it produces similar results over and over again, regardless if other researchers use it.
- Validity refers to how well a method measures what it intends to measure. A study has a high degree of validity if the data generated is very relevant for answering the research questions.

In essence, validity and reliability are two ways of ensuring that a method used for gathering data is credible, which ultimately contributes to the trustworthiness of a study. It should be stressed that these concepts are mainly relevant in regard to quantitative research, where the aim is to generate answers that are quantifiable. Golafshani, (2003, p. 600) writes: “Although reliability and validity are treated separately in quantitative studies, these terms are not viewed separately in qualitative research. Instead, terminology that encompasses both, such as credibility, transferability, and trustworthiness is used.” Since this thesis has a qualitative research approach, the concept of credibility has to be treated and discussed in other ways.

It can be hard to ensure credibility in qualitative research, especially in interview studies. As Widerberg (2002, p. 18) points out, a common dilemma is that every interview is a unique situation between the interviewer and the interviewee. Even if another researcher would use the same set of interview questions, the interview would still not be carried out in an identical way, due to the many contextual factors that can affect the situation. Therefore, it tends to be very hard to replicate the results from an interview.

A general advice is given by Trost (2005), where he argues that the overall credibility in a qualitative study

mainly derives from a clear and transparent research process, in the sense that it must be obvious for readers how the study was conducted. Each study is unique and the researcher therefore needs to take into account the special circumstances that might affect the research process and then present them clearly.

Three further issues regarding the credibility of this study should be stressed:

1. Transcription and Coding - The transcription of the recorded material was done only by me. One approach to ensure higher credibility in this regard would be to use two different researchers transcribing the interviews individually, afterwards comparing their results (Kvale and Brinkmann, 2014, p. 244). Due to the financial and time related constraints of this thesis, this solution was not realistic to implement. When all of the recorded material was transcribed and it was time to code and sort out the relevant parts of it, a category system was used. According to Mayring (2014, p. 39-41), if the category system is clearly defined, other researchers should be able to use it and thus reach similar results from the same material, which can help to improve the credibility. For further details on how this was done in this thesis, see chapter 6.8.

2. Translation – All interviews were conducted and transcribed in Swedish. In order to ensure better readability for readers who do not speak Swedish, the results were translated into English by me. The intention was to keep the meaning of the original material as true as possible when translated, or in other words - to translate it in a “neutral” way, to the degree that it is possible. Perhaps certain words have alternatives or nuances in the English language altering the meaning of the message in ways I did not notice. A better approach in this regard could have been to use two translators who translated individually, and then compared their results in order to reach the most accurate translation possible. Again, this was not realistic due to time related and financial restraints.

3. Interview situations - At the beginning of a couple of the interviews, some of the interviewees expressed gratitude for being interviewed, since they assumed that the purpose with this thesis was to prove how great educational games are for learning. Therefore, they seemed to put a lot more emphasis on explaining all the benefits they consider with GBL. I never shared my own thoughts and opinions regarding educational games and GBL during the interviews, even though some interviewees asked me. I got the feeling that some interviewees were saying what they thought I wanted to hear, in some situations. This is of course a problem in many kinds of interviews - one can never know if interviewees are sharing their honest opinions on a matter. Just the mere presence of an interviewer surely affects the answers interviewees share. In regard to this thesis, the purpose is not to find or uncover what teachers truly believe or think, since it can never be known. Instead the approach of exploring what they say, and in some regard, do not say has been chosen.

7. Results

The findings from the interviews are presented in a thematic manner in this chapter, in the form of descriptive text and direct quotes divided into four sub-chapters. Each sub-chapter relates to one of the four research questions, as described in chapter 2. The results are analyzed and discussed in relation to the research questions, in chapter 8.

As a rule of thumb, longer quotes from the interviewees' answers are presented. This is done in order to provide readers with better insight into the full statement of the informant. After all, many of the questions asked during the interviews required longer reasoning and chains of arguments as an answer.

7.1 What design features make a game 'educational', according to teachers?

During the interviews, the interviewees were asked to describe what it is that makes some games educational and other games not educational, and if games can be educational at all. They were encouraged to base their arguments on what they regard and define as games, as well as what they regard as educational.

The only design feature in games mentioned by the interviewees was the content, meaning that games with a relevant content in the form of theme, story, aesthetics or information was seen as a factor that partly distinguishes educational games from non-educational games. For instance, a game about a specific period in human history would allow players to learn about that, thus making it become more of an educational game, rather than a non-educational game.

A skeptical view was expressed among the interviewees to the idea that educational games tend to be regarded as a category of its own. It was claimed that games in general are neither educational or non-educational, but rather exist in a gray area between the two categories. Instead it was argued that essentially any game can become educational, depending on how a teacher decides to use it during a lesson. Teachers are the ones that add the true educational qualities to games, depending on how they use them in classrooms or in other learning situations.

Although the teacher was seen as the major factor that makes games educational, there was still a divided view on whether games themselves can contain educational qualities or not. One type of argument expressed by teachers in all sectors of the school system was that all games are educational in some sense, since players always learn something when playing, even if they play without having a teacher nearby. The opposite view - that games are not educational in themselves – was primarily expressed by interviewees working as preschool teachers.

7.1.1 Games are not educational by themselves

Mainly the preschool teachers seemed to regard educational games as a term with little value. Just because a game is labeled or categorized as educational does not mean that it has any educational qualities. Instead the teacher is the most important factor that makes a game educational.

> *Educational games* is just a term. What we as teachers do with games is the interesting aspect. You can use basically anything and gain learning from it, as long as you use it in a thoughtful way. You can for instance use Angry Bird if you and your pupils are interested in it. It all depends on what you do with the game and how you use it.
>
> [Kicki, preschool teacher]

I think *educational games* is a vague term. I would say that there are no educational games. Instead it depends on what I as a teacher do with a game. I can use Tetris in an educational way. Fingu is a game you can easily think is educational. But the game in itself does not lead to any learning. If I were to let a child play Fingu alone, then that child might in fact not understand or learn anything. Is the game really educational then? Pedagogy is a subject, to be a teacher means to have a certain degree of pedagogical skills, ability or knowledge. The educational part in games relies on teachers who use their skills in pedagogy, together with a game. Minecraft can be educational depending on how I use it. It can also be a game purely for entertainment, if I choose to use it in such a way.

[Lennart, preschool teacher]

I do not think games are educational. From the perspective of preschool children, to make something educational requires that we as teachers are present and guide them. […] I think educational games are educational first when a teacher is present who can guide the children in a game.

[Liv, preschool teacher]

I would say that you can use any game for an educational purpose, as long as you have a good idea of how to use it. It depends on what approach the teacher has when introducing a game to the children.

[Isola, preschool teacher]

7.1.2 All games are educational

In contrast to the notion that games are not educational, the opposite view was also expressed among the interviewees - namely that all games are educational in some sense, since players always learn something by playing. But having an active teacher involved would lead to more meaningful learning. Games with a more relevant content were argued to be more educational than other types of games, although that was not a necessary criterion for a game to be used for educational purposes.

It depends on what games and how they are played. There are games that only rely on shooting, while other games have more meaningful content. You can of course get something meaningful from a game that contain a lot of shooting as well, but it can be hard. Simulations such as Sim City can give players insight into how to manage a city, or the game Democracy can kind of show players how a country is managed. Shooting games can help players develop reflexes and tactical thinking. You can learn something from virtually all games, as long as the teacher reflects on how to use them.

[Mårten, preschool teacher]

By definition I would argue that virtually all games are educational because you always learn something. But the teacher has to guide the pupils so they learn what they need to learn.

[Jon, primary school teacher]

> There is a certain degree of pedagogy in games, but that is not automatically linked to the curriculum. The teacher needs to make that connection. […] Many teachers might hand King of Math to students, assuming that the game in itself is educational. But from the perspective of gamification, the game is rather based on levels, badges and experience points that do not really give any deeper understanding of mathematics. But it is treated as if it does. The danger of using games in school is that so many teachers assume that it is a form of paradigm shift where all of a sudden, children can learn by themselves as soon as they get an iPad. The teacher is required to make the content in the game understandable for the students. […] In some sense there is always a form of guidance for players that play any type of game, so they are able to understand and complete it. There has to be a degree of built in pedagogy in games. The question is if that type of pedagogy is as good as the pedagogy used in school.
>
> [August, upper secondary school teacher]

Anette described a digital geographical game that one of her students likes to play, where players are supposed to put flags on the correct countries on a map. She considers it educational since the game helps her student to develop geographical knowledge:

> It helps my student to proceed in Geography. That is an educational game in a sense, but all games develop children in some ways, I would say. There is a thin line since it depends on what you want to achieve with a game. There are educational games but all games are educational in some ways. Or most games are, at least. […] I think we call games educational when the content in them are related to school subjects.
>
> [Anette, primary school teacher]

Although the teacher was regarded as important for making students learn something from games, some interviewees argued that players can still learn alone by playing games, especially as long as the content is of relevant nature:

> I am certain that you can learn alone by playing games. When I grew up, so called *civilization games* were very popular, where players had to manage Rome, bring food to the population, and so on. You learned a lot about the historical conditions during that specific era in the game. A teacher was not required to teach you that. You learn it in the game and then you play better.
>
> [Cornelia, upper secondary school teacher]

> I certainly think you can learn something alone when playing. But I think you generally learn more when you play together with others.
>
> [Isola, preschool teacher]

7.2 What design features in games are important for learning purposes, according to teachers?

During the interviews, the interviewees were asked if any specific games are more suitable than others to use for learning purposes, as well as explain how they reason. One particular argument seemed to dominate among the interviewees, namely that games with an open game world in which players are free to choose how to act are very suitable to use in education.

7.2.1 Open game world

> The more open the game world is, the better it is! I like when games are clean and open so players have a lot of possibilities and can choose their own ways, which benefit their problem solving abilities. I do not like it when games have a fixed path where it is either right or wrong, and players receive stars when doing the right thing.
>
> [Kicki, preschool teacher]

Kajsa is the interviewee who has the least experience of games. She has barely ever played any digital games, but she explained that she sees potential in using The Sims in upper secondary school, partly due to the open game world where players can interact freely.

> I would easily use The Sims in education, since it can generate so many interesting discussions about values and ethics, due to the amount of cooperation and problem solving in it. You as a player are not the one deciding everything that happens, instead other players are as well, and you need to find creative solutions. Just as you need to do in our society.
>
> [Kajsa, upper secondary school teacher]

Minecraft was praised as a good game to use for learning purposes, mainly due to its open world which enables a form of freedom where it can be played in many different ways.

> The children could be given a specific mission or project, such as building a house. They would need to cooperate to construct it. It is both engaging for the children and it is a good way to practice their skills in teamwork. They can receive different tasks to do, various problems to solve. You can do a lot in Minecraft!
>
> [Mårten, preschool teacher]

> I think games with an open world are better, where there are no reward systems or any ending. I prefer games where players build, construct and experiment in the game world. […] I think Minecraft is a very good game. We do not use it right now at the school where I work but I have examined the concept quite well. You can build virtual houses, societies and environments. The game is infinite without any specific ending. It is a process that can go on forever if you like. You can bring something from the real world into the game, for instance by looking at a building in Europe and then construct it in the game.
>
> [Isola, preschool teacher]

> Minecraft can be anything – how to cooperate, how to construct, how to plan, and much more. There are many educational options in it and it all depends on what you as a teacher want to achieve. You can use it to practice math. You can use it to develop the logical thinking of your students. In a sense would I say that it is an educational game, but it might not be categorized in such a way.
>
> [Anette, primary school teacher]

> Games need to challenge the students in some way. It must be required of them to think really hard, rather than just follow a specific route. They shall be able to create, as in Minecraft. It is a very free game where there are plenty of ways to solve problems. I consider that to be more educational than games that are more narrow.
>
> [Jon, primary school teacher]

Lennart described how he and his colleagues used Minecraft together with children in preschool to conduct very basic scientific experiments.

> As an example, we have discussed what happens if you mix lava with water, or what happens if you put sand in the oven. It becomes glass. We have used Minecraft to introduce the idea of experimenting. We can experiment freely in Minecraft. That has been our focus. […] We saw potential in Minecraft, due to the freedom and the openness.
>
> [Lennart, preschool teacher]

Another perspective on games with an open game world was shared by Adrian. He argued that games should preferably have a depth in order to be suitable for learning purposes:

> A game should be deep. For instance, in Civilization 5 players need to move armies on a map, and if there is a combat the winner is the one who has the stronger army. If moving armies was the only thing players could do in Civilization 5, then the game would have too low quality to be used in education. There would be no purpose of using it, apart from maybe in mathematics, where students could be given a task to calculate the strength of armies. But the game contains other aspects as well, such as a type of technology tree where players can see how civilizations develop through the ages. There is also a type of Wikipedia function that contain facts about real historical persons and structures that are also present in the game. That is what I call the depth of a game, which I think increases the possibilities of using a game in education.
>
> [Adrian, upper secondary school teacher]

7.2.2 Other design features

In contrast to games with an open game world, a few other games and design features in games were also described. When asked to give an example of a good educational game, Mårten and Kicki replied:

> Krakels ABC that was released in 1999. It is very explanatory. When players are dealing with letters in the game they are voiced. There are tasks to solve and when you have solved a couple of them you can proceed in the story. If you fail with a task you get to try again. The next time you will succeed and can continue in the story. There is no stop just because you failed with something. Mulle Mekk is also a good game. Players shall solve tasks in it but they are not punished if they fail.
>
> [Mårten, preschool teacher]

> I think Moji Klockis is a good game for children who are trying to learn how the clock works. To learn that, without using games or digital tools, requires the almost constant presence of an adult. I think it is among the hardest things you can teach a child since it requires so much repetition. Moji Klockis enables children to learn the clock together, in a form of mutual learning where they help each other.
>
> [Kicki, preschool teacher]

It was argued that competition in games can be beneficial for the learning outcome. In regard to playing games, Cornelia stated:

> It is interactive. Instead of being a passive recipient you become an active participant. I am not a person who likes to compete, but I have understood and used competitions since some people learn better if they have someone to compete with. Either against yourself or against another team. I think you learn more without being aware of it.
>
> [Cornelia, upper secondary school teacher]

Feedback was praised as one aspect of games that is usable in learning situations, meaning the way mainly digital games display what players have achieved so far.

> There are many things games are good at, apart from offering a challenge to players. Digital games in tablets and smart phones tend to have some form of visual representation that display what players have achieved in the game. Some kind of progress bar that for instance show that you have reached level four in Candy Crush, but to reach level five you need to fill the entire bar on the screen. So you can see how much more you need to do. If we compare it to school, there should be some way to show where every student currently is and how much more they need to do, in order to reach the next grade.
>
> [Adrian, upper secondary school teacher]

Ann-Katrin explained a type of quiz game she plays together with her students in primary school. Each student answers the same set of questions individually on their tablets, one question at a time. After all students have answered a question, their answers are converted into statistics that is displayed to everyone. The statistics show what answers all students choose, what the right answer is, as well as who is currently leading in terms of points. Then they proceed to the next question and repeat the process.

> The children loved the game immediately when I introduced it to them in the second grade! I collect questions from everything we have worked with during every semester in school and add it into the game. It becomes a form of rehearsal, where they get to repeat what they have learnt. The game converts it into statistics so I can see what they are good at or if they struggle with something!
>
> [Ann-Katrin, preschool teacher]

7.3 What is meaningful educational usage of games in classrooms, according to teachers?

During the interviews, the interviewees were asked to describe how they think games can be used in classrooms in fruitful ways, if at all, as well as what they view as advantages of using games for learning purposes. In this section, their answers are categorized into two themes: advantages related to the learners' attitudes, and advantages related to their learning. Each theme is presented in a subsequent order.

7.3.1 Positive attitude to education

One benefit of using games in education, according to what the interviewees expressed, is the positive impact games can have on students' attitudes towards school work. Games can be a way to bring joy to something that students may otherwise consider as rather dull.

> Motivation is very important in my job. I work with adolescents who do not have any good stories from their time in elementary school. They associate their schooling with bad experiences rather than learning. I use games as a way to make education not feel like something negative. I have a group of students who are good at Minecraft but they have trouble with spelling. Games can be a way for us to connect.
>
> [August, upper secondary school teacher]

> I think of pleasures. To play while making progress. To create an environment that is playful where students want to learn - where they can clearly see their learning goals.
>
> [Jon, primary school teacher]

Some interviewees explained that games can be a powerful way to grasp the attention of children.

> Children tend to be genuinely interested in computers and games. They often consider it to be fun. Games capture their interest quite fast when we use them in our school. It can even grasp the attention of children who otherwise have a hard time being interested in other types of school work.
>
> [Anette, primary school teacher]

> Games is one way to capture the attention of children, where it becomes a joyful way to learn. It can be one way to attract them to learn new things. Games can be meaningful if they are used in the right context. The children at my school are used to digital technologies. They like when things happen.
>
> [Liv, preschool teacher]

> It depends on the child. Some children have difficulties when focusing on certain activities, for instance when they build with blocks. It can be easier for them to focus if they use a digital tool. There is more environment in digital games. […] Games can make it easier to sit down and focus, at least for some children. Some of them might feel it is easier to build with blocks, while others focus better while playing Minecraft. When you play you can get inspired by the environments in the game and try to build the same thing in the reality, for instance with real building blocks. Games can create new interests.
>
> [Mårten, preschool teacher]

Some of the interviewees expressed fascination of how games seem to enchant students. They wondered if it could be possible to use the motivational factors from games and apply them in regular school work.

> The motivation is high in games. The question is how can we as teachers use that motivation? […] We should be able to use that in school. What is it that makes students able to eagerly solve problems in games? In comparison, when they sit and solve problems in a math book they have no motivation. That would be really interesting to research!
>
> [Kajsa, upper secondary school teacher]

> I like that there are so many different ways to reach children, since they are all so different from each other. Games is one way of reaching them, especially the children that you would not otherwise reach as easily. It captivates them! It is so fascinating. What is it that causes this? Something is captivating them! […] It captivates me too. It is incredible! Children who normally have a hard time to focus, all of a sudden they can focus in games. I do not know what that is. That is the big question.
>
> [Ann-Katrin, preschool teacher]

> There are plenty of things schools could learn from games and game development, such as how games work, what makes games fun, how to create flow. A feeling you can have while playing, where you constantly want to play a little bit more, where you want to complete the next challenge.

> According to research about motivation, you need to have a challenge that is precisely in reach of what you are able to achieve.
>
> [Adrian, upper secondary school teacher]

Games can also motivate students in the sense that it becomes easier for them to discuss certain topics, when doing so in a game. August explained how games are useful for making his students feel comfortable in certain types of school related situations.

> They know how to play games, and in school they get the social experience of playing, especially when playing board games. They can enter a kind of role while playing, which makes it easier for them to discuss school related topics.
>
> [August, upper secondary school teacher]

7.3.2 Assumed to have positive effects on learning

Another benefit of using games in education expressed by the interviewees, apart from increasing the motivation, is that playing games can be beneficial for students' learning. Some interviewees argued that using games is one way to reach a more authentic form of learning, which means to create situations where neither the teacher nor the students know the answer beforehand.

> Games can create communication and meetings. Children are born into a world of digital tools so they teach us - the adults - a lot. That becomes maker culture because we learn together. That is what I regard as the most important type of learning. We learn here and now, in a real way. Teachers are no longer just passing on knowledge, we are instead becoming explorers together with the children. […] Cooperation is probably the most important word, to create a collective understanding. To use and teach open questions to the children – how, what and why. That makes us all reflect together, both teachers and children. […] Another advantage is to be able to cooperate and challenge each other. We all carry our own experiences that together create a new experience and new thoughts on how to proceed.
>
> [Isola, preschool teacher]

> One of the major benefits of using games in school is that few adults know anything about games. A term that is common in preschool is *discovering adult*, meaning to discover and explore together with children. No matter what experiments we do in preschool, we as teachers already know what is about to happen. We just pretend to not know. Of course the children understand that we know. When we started to use the Turf game to hunt for treasures, no one knew how it worked at first and no one knew what would happen. Not us, not the children. We really learned it together. There is a completely different level of learning when you explore something together with the children, where no one knows how to do it beforehand. We all know parts of it and together we develop knowledge. The children are now able to be more active when we treasure hunt, due to the digital tools. They can lead the treasure hunt and we as teachers do not need to lead anymore.
>
> [Kicki, preschool teacher]

Jon argued that using games is one way to create learning situations that are so fun or interesting that students forget that they learn.

> What I like with games, and what I attempt to make all my lessons be like, is to ensure that the pupils have so fun that they forget that they learn. That often leads to the best form of learning.
>
> [Jon, primary school teacher]

Another perspective on learning expressed by the interviewees was that games can be a good way for learners to repeat basic knowledge over and over again, so it really sticks in their memory.

> One thing that is both positive and negative is the immediate reward. Games are often designed so players get rewarded quite quickly which encourages them to proceed. […] It becomes a reward to reach 100% correct answers. In that regard, it is quite easy to get children to sit down with a game and repeat something that they need to learn. Now I sound like one of those teachers who only wants children to sit down and repeat all day, but I see it as a complement. That has to be a part as well in school, together with gaining an understanding of course. Without repetition, it is hard to make progress.
>
> [Anette, primary school teacher]

> When I use the quiz game together with my pupils, we repeat things they have worked with in class. This is a way to repeat what they have already learnt or to remind them if they have forgotten. If we do 20 questions, the pupils often want me to go through them all one more time! It becomes a new chance for them to get the right answer, which they enjoy. This repetition is faster than if I had to stand in front of the class and explain everything again and again.
>
> [Ann-Katrin, preschool teacher]

Cornelia explained that she uses a digital game together with her students, in which they have to learn and repeat words in French. When asked why she uses a game for repeating and learning words, she replied:

> It is not necessary to use a game for this exercise. But it becomes more fun. Partly due to the competition, but also because there is a practice mode in the game where the students can look at the words and the categories. I have noticed that students learn these words without any problems. I don't think they would learn them in five minutes otherwise. I can't say I understand the mechanism behind it, I have just noticed that it works really well. There is something with it!
>
> [Cornelia, upper secondary school teacher]

Another perspective on learning was expressed by the interviewees, where some of them consider games usable for immersing students into situations, as a way to make them experience how something could feel or be like.

> A historical game can create a feeling for the history, a feeling of how it must have been. For example, how could people vote for Hitler? If students are put into situations in games and given the feeling of how it must have been, you can reach them in another way compared to just reading about it in a book. Film can do it in a similar way.
>
> [August, upper secondary school teacher]

> One of my colleagues, a social studies teacher, uses a kind of game where the students are managing a country. You become a part of what you are learning!
>
> [Cornelia, upper secondary school teacher]

> I can do things in games that I cannot do in reality. Children do not walk out in the forest and chop wood, nor plant seeds that grow in a few hours. But you can do that in Minecraft. You can feed the animals, you can take care of their offspring, and much more. An interesting columnist once wrote that games are amazing - by playing games I have been Napoleon, Nefertiti, I have killed and I have died, I have been resurrected, I have constructed. All of that have I experienced thanks to games. That is probably the biggest advantage. Games allow you to experience so much more than what you can do in reality.
>
> [Lennart, preschool teacher]

Another advantage of using games is that they tend to be customizable, meaning that the teacher can adapt the game to match it with the learning needs of students.

> Compared to books, games are more customizable. You can adapt to the individual needs of pupils. There are so many different pupils in a class. If you for instance only buy math books, the math tasks in them are as they are. It is harder to challenge the pupils and adapt the material to their needs by using books. If I use the game Bingel, I can adapt the game so that it becomes challenging no matter how good you are at math. I think that is an advantage.
>
> [Anette, primary school teacher]

7.4 What problems and challenges do teachers express in regard to using games for learning purposes?

During the interviews, the interviewees were asked to describe what they considered to be disadvantages and problems of using games for learning purposes. In this section, their answers are categorized into three themes: problems regarding how teachers use games, problems regarding the social environment in school, and problems with game design. Each theme is presented in a subsequent order.

7.4.1 Teachers' use of games in the wrong way

A major concern was expressed by the interviewees, namely that games can be used for educational purposes in thoughtless ways by teachers. To avoid problems that may occur due to bad usage, teachers need to be aware how to use games in a conscious and thoughtful manner.

> A major problem with games is that they can be used in thoughtless ways in school. That problem applies to any type of educational tool that is used without any thought. I as a teacher need to be aware of why I intend to use something.
>
> [Lennart, preschool teacher]

> I think it is important that teachers critically reflect about games so that they are used in thoughtful ways. That is the responsibility of the teacher. Otherwise I see no direct problems with games.
>
> [Mårten, preschool teacher]

> It is the same concern as showing a movie to the pupils. If I am not aware of what type of film I am showing, then of course everything can go completely wrong. It is the same with games. A teacher must not be better at the game than the pupils, but you need to understand what the game is about. The teacher has to ensure that the situation becomes educational. If there is no educational thought when playing a game, then there is a risk that it is just a waste of time rather than a good opportunity for learning.
>
> [Jon, primary school teacher]

> A disadvantage is that sometimes there is no educational thought when games are used. As a teacher, you have to know why a game is used.
>
> [Cornelia, upper secondary school teacher]

Anette described an experience she encountered in a school:

> I worked at a school where every pupil had a computer. It was an easy way for temporary teachers, who covered when the ordinary teacher was sick, to just let the pupils play math games on the computer by themselves. A way to escape the responsibility of teaching. I think that is a major disadvantage. The pupils could be told to just sit and play some math games for the rest of the lesson. There was never any thought behind it.
>
> [Anette, primary school teacher]

Liv also stressed the importance of an active and supporting teacher, to ensure that a gaming activity becomes fruitful. She does however not consider it as necessary for educators to be expert gamers:

> If teachers want to use a game they need to know how to handle it so it becomes a good learning activity for the children. I had no knowledge about Minecraft, but I was aware that I needed to guide them in the game to ensure that it became meaningful. Teachers do not need to know the game in every detail beforehand but they still need to be present and active.
>
> [Liv, preschool teacher]

Kicki claimed that one problem of using games in classrooms is that there is a risk of receiving criticism. It is therefore important to communicate why and how the games will be used to ensure that others understand the educational benefits of it.

> It can be problematic to make parents and other teachers understand the benefits of using games. There is a risk that you will be criticized for it. You must be able to explain how you reason and why you use a game.
>
> [Kicki, preschool teacher]

Aside from the view that games can be used in thoughtless ways, August and Adrian also expressed that a problem is an over optimistic attitude towards GBL among many teachers. They argued that some educators tend to treat it as a salvation that will save the Swedish school system:

> There is a lot of discussion about the lack of motivation among students and that the results from PISA are declining. Sometimes it seems like game based learning and gamification are treated as a form of salvation that will improve the PISA results. I think that is a problem.
>
> [August, upper secondary school teacher]

> In general, games are not a golden path for the Swedish school system. It is not the solution to all our problems. Rather the opposite.
>
> [Adrian, upper secondary school teacher]

7.4.2 The social environment in school

One type of problem expressed by the interviewees was that games can influence the social environment in school in a negative way. Almost every interviewee had plenty of students or children in their classes with a strong interest in games, even to the point where playing games was a lifestyle for many of them. One of Kajsa's classes in upper secondary school consists of young men, whereof a large portion is almost addicted to playing digital games, according to her. Their gaming habits negatively influence how they sleep, which in the long run affect their school work and grades. Instead of blaming the students, she wants to bring their interest in games into the classroom. When asked if she sees any problems with using games in education, she replied:

> No, I do not. The problem is that games are not a part of school. […] A couple of years ago, teachers argued that all smart phones should be forbidden in the classroom. I would say the opposite. We need to bring smart phones into school and treat them as tools. It is the same thing with computer games. They need to be a part of school as well, so we can start discussing them. No, I do not see any disadvantages. We ignore the reality. In upper secondary school, students are soon adults. We need to help them to find a balance in their everyday life.
>
> [Kajsa, upper secondary school teacher]

Ann-Katrin is concerned about the gaming habits pupils at her school display during breaks, where they rather play games on their smart phones than socialize with each other. She did however not see any problems with bringing games or other forms of digital tools into the classroom:

> I have never thought about that question. I have never thought in that way. The only thing I have thought of is when the older children play on their smart phones during break time. They do not socialize with each other. That has started to frighten me. The social skills they gain when hanging out together, when they see each other's faces. They play with their phones instead. I think that is dangerous. But to use games and digital things in education, there is not a single problem with that. Not a problem. I do not see that. I do not know what the problem could be. It is a complement; it is one of all tools there are. I think that is great.
>
> [Ann-Katrin, preschool teacher]

Isola also considers the social consequences of gaming in school as a potential problem. She explained:

> A problem for older children can be that new discourses and codes are created, that younger children do not understand. It can be like a new language where it is required to participate in the virtual world in order to understand. One advantage is that it can inspire others to participate in the community, but the disadvantage is that it might create a feeling of "us" and "them" between children.
>
> [Isola, preschool teacher]

Another type of social problem that can emerge when games are used in education is that students change attitude towards regular school work.

> There is a risk that pupils consider other things in school boring if they are allowed to play too much. Another disadvantage is that all of a sudden, internet dies. […] No one can log in anymore. Time flies. There can be a lot of disruption which can cause the atmosphere in class to be quite worried and anxious.
>
> [Anette, primary school teacher]

August's class consists of students who have had bad experiences during their school time. He sometimes uses games in his lessons as a way to motivate them and to make them not only associate learning with negative moments.

> My students can have a hard time coming to school at all, or participate in any lessons. The disadvantage is that they come to my lessons expecting to play games. That is however not necessarily a problem. The important thing is that they are in school. I can create new teaching situations based on games they like. I am satisfied when they show dedication in my class.
>
> [August, upper secondary school teacher]

7.4.3 Conflicts between players and game design

A few problems were mentioned by the interviewees in regard to how the design in games can make them unsuitable to use for learning purposes. It was argued that educational games can be completed without resulting in any meaningful learning. Even if a game is designed with the intention to make players learn something, that can sometimes be ignored because the players just want to complete and win the game as quickly as possible.

> When children play a game they want to win as quickly as possible. If there is some form of content in the game that they are supposed to learn, they might not even notice it. Therefore, we as teachers need to be present while they play. Even if they play a game that is considered to be educational, they just care about winning.
>
> [Liv, preschool teacher]

> As a teacher, you need to be aware that children can complete a game without learning anything at all. Children can cheat themselves through a math book too by looking at the end, where the answers tend to be printed. It is therefore super important to discuss and reflect together with the children, to hear how they think.
>
> [Kicki, preschool teacher]

Another type of problem related to how games are designed is that they sometimes contain content that is problematic and collides with the values that school should teach.

> A lot of games lack in terms of values, in regard to how women are portrayed, how hetero sexuality is the norm, and in regard to racism. There tend to be different forms of violations in digital online games, such as how the female characters in many fantasy games are portrayed in a sexually provocative way, compared to the male characters.
>
> [Adrian, upper secondary school teacher]

8. Discussion

This chapter contains seven sub-chapters, whereof the first four chapters contain an analysis and discussion of the results, in order to answer the research questions, as described in chapter 2. The fifth sub-chapter contains a discussion about the results in relation to the popular discourse surrounding GBL, as described in chapter 3. The sixth sub-chapter discusses the limitations of this study. The seventh sub-chapter contains suggestions for future research.

8.1 What design features make a game 'educational', according to teachers?

The results imply that the teachers who participated in this study primarily evaluate the learning situations games are a part of, rather than any specific educational qualities games may have. Games are not regarded as being educational based on features in their design. Instead it seems like other aspects surrounding games – how teachers use games, how lessons that contain games are planned – are the most important parts of educational games. The teacher is described as being the key making games truly educational, and could even turn seemingly meaningless games into meaningful learning situations, depending on how games are used as part of a lesson. These arguments indicate that the interviewees mainly evaluate GBL through a sociocultural perspective on learning, where the activities surrounding games are regarded as crucial for the learning outcome (Egenfeldt-Nielsen, 2006, p. 199-201).

Only one design feature is described as a difference between educational and non-educational games, namely the content. As long as the content in a game is of relevant nature, represented in the form of a theme, learning may occur for players who play it, even if there is no teacher involved. Hence, a game about Rome can make players learn about history, a game about democracy can make players learn about governments, while a game about shooting barely contains any relevant content that leads to any learning. But as some interviewees also pointed out, a relevant content is not necessarily a guarantee that players learn what they are supposed to learn while playing. Therefore, the participation of the teacher is crucial to ensure that meaningful learning occur.

8.2 What design features in games are important for learning purposes, according to teachers?

It is argued that the most important design feature a game can have, is an open game world, in which the rules allow players to freely act as they desire. Games with an open world tend to be playable in many different ways, which means that teachers can shape and adapt such games to suit with whatever learning situation they have in mind. This seems to fit with the argument that teachers are the ones providing the educational qualities to games, as discussed in chapter 8.1. Hence, games with an open game world offer more possibilities for teachers to use them after their own will. Of all types of games that contain an open game world, Minecraft in particular is heavily praised and considered to have great educational qualities, due to the freedom it offers to teachers and players. Traditional role playing games and live action role playing games also have a rule system that allows them to be played in countless of ways, where teachers can shape them after their own will. Such games have been used in school for decades, for instance to teach how negotiations between countries at the United Nations work. None of the interviewees mentioned or discussed those types of games, which seems to be an indicator that they mainly associate GBL with digital games.

Three additional design features in the form of game elements (See Bedwell et al. 2012) are described as important, namely *assessment*, *conflict* and *immersion*. Games that contain these game elements are considered to be extra suitable to use for educational purposes.

Assessment, meaning how games provide feedback to players, is described as one way to create motivation by giving players a sense of their achievement. In digital games, a common method is to display the progress of players in the interface on the screen, alternatively to reward players with some kind of bonus when they achieve something in a game. It is argued that games are superior to school when it comes to providing students with constant feedback - teachers need to correct, evaluate and grade the work of students manually, before giving them feedback. In comparison, that tends to be automatized in digital games and can therefore happen much quicker. *Conflict* is briefly mentioned by the interviewees, but still considered as a useful game element since it can also be one way to increase the motivation of players, especially in situations where players need to compete in order to win a game. Just motivation is the reason that also *immersion* is seen as an important game element, meaning that games can create an emotional state where players lose a sense of time and space to become absorbed into the game world. Earlier research show that teachers regard the theme and games' ability to provide feedback to players as important design features om educational games (see Sardone & Devlin-Scherer, 2009).

Based on the results, games that contain relevant content as represented by the theme, have an open game world and motivate players, are seen as most suitable to use for learning purposes. No other design features in games, in the form of characteristics as described in Elias, Garfield and Gutschera (2012), game mechanics as described in Björk, Lundgren and Holopainen (2003) or game elements as described in Bedwell et al. (2012), are regarded as important for the educational qualities of a game. This does not mean that teachers view other aspects of game design as unnecessary. They did not bring up or emphasize other design features in games as important. Although it was argued that players may potentially learn something alone while playing, if a game contains a relevant content, barely anyone stressed the importance of whether any pedagogical principles can be designed into a game, thus improving the way it communicates its message or content to players. Interestingly enough, this seems to suggest that teachers see a blurry line between good and bad educational games, where there are few criteria that distinguishes potentially more suitable games from potentially less suitable games to use.

8.3 What is meaningful educational usage of games in classrooms, according to teachers?

The results indicate that games are mainly seen as useful for enhancing and enabling other forms of learning, compared to traditional school work, such as books or lectures. In particular, four diverse ways games enhance and enable learning are described – motivation, immersion, authentic learning and repetition.

Games are regarded as a way to motivate students by adding joy into school and thus make it fun to learn, resulting in improved learning. Immersion is described as one way to motivate students by playing games, where they can get so engaged in playing that they lose their sense of time and space. Immersion is also argued to lead to a form of learning where players feel and experience different types of situations, almost as if they were to experience it themselves in real life. According to earlier studies, teachers view motivation as a strong benefit and reason for using games in school (see Bakar, Inal & Cagiltay, 2006; Pastore & Falvo, 2010; Razak, Connolly & Hainey, 2012).

Authentic learning is argued to be an educational advantage of games, described by the interviewees as situations where neither the students nor the teacher know the answers beforehand. In that sense, games become an environment in which learners are able to freely solve problems, create, explore, conduct experiments and cooperate. This line of thought is reminiscent of the constructionist view on learning (see Papert, 1980), where learners explore and engage with material within an environment, as a way to construct

knowledge and develop cognitive skills. Although such thoughts are emphasized by teachers working in different sectors of the school system, it is an especially dominant argument among the interviewees who work as preschool teachers. In particular, it is argued that children shall be able to find their own solutions to problems in games, rather than following a strict path of right or wrong answers. This seem to imply that mainly the preschool teachers view GBL with constructionist ideas for learning in mind, and therefore favor games that are so called microworlds (Egenfeldt-Nielsen, 2006, p. 197-199).

Games with strict boundaries where players are supposed to learn about a specific topic while following a narrow path, are regarded as inferior in comparison to open games with a lot of freedom. There is a bit of contradiction among the interviewees in this regard. Some teachers explicitly stated that they dislike games that were strict, while later mentioning strict games as examples of good educational games. Additionally, it is also argued that repetition of knowledge is a good reason to use games in school, which requires games with a stricter form of rules. Interestingly enough, one interviewee who argued that games are useful for repetition also apologized for sounding like a boring teacher. This seems to reveal a conflict in how some teachers view their profession – pedagogy based on constructionism encourages exploration, creativity, experiments and problem solving, while pedagogy based on behaviorism tends to be associated with control, repetition and a strict behavior among pupils. Some teachers might therefore be concerned about being regarded as “boring” and strict if they favor games that appear as boring, even if they think such games lead to learning. Therefore, modern digital games that enable pupils to express their potential are openly praised, compared to games based on repetition and other aspects of behaviorism, as described by Egenfeldt-Nielsen (2006, p. 190-194).

8.4 What problems and challenges do teachers express in regard to using games for learning purposes?

The results indicate that teachers associate GBL with few problems or challenges. There are statements that suggest that some interviewees see no issues of incorporating games into school. The main concern seems to be that games can be used in thoughtless and badly planned ways by teachers during lessons, resulting in no learning. This suggests that teachers are putting a heavy burden on the shoulders of themselves and others, in the sense that games are no better than how teachers use them - if games do not provide the learning effects they intend, the teachers are to blame, rather than the games. It is also argued that there is an inherent problem in games, in the sense that players can complete a game without learning anything at all. Games can encourage players to just win as quickly as possible and therefore ignore everything they are supposed to learn, but still give an impression that they are learning. Although this concern is expressed, none of the interviewees seem to draw connections between how a game is designed and its ability to give the impression of learning taking place (see Linderoth, 2012).

Using games for learning purposes in classrooms seems to be regarded as a balancing act. Teachers need to be cautious about how often they implement games during school time. If students are allowed to play too much there is a risk that their attitudes about school become affected to the degree that they no longer regard ordinary school work as interesting or meaningful. Similar results can be found in other studies as well, where teachers view distraction among students and the risk that students do not learn anything as problems with using games in school (see Bakar, Inal & Cagiltay, 2006; Pastore & Falvo, 2010).

8.5 The popular discourse

There seems to be many similarities between the arguments expressed by the interviewees and the arguments found in the popular discourse surrounding GBL, as described in chapter 3. For instance, the interviewees focused almost entirely on digital games during the interviews, just as the focus tends to be on digital games in the contemporary debate about GBL. Every interviewee mentioned digital games as examples of good games to use for educational purposes, except in one interview where one teacher briefly discussed board games as well. Almost all of the interviewees who had their own experiences of using games in education, had only used digital games.

There might be several reasons for the dominance of digital games in school. For one, children and students may themselves have a strong interest in playing digital games in their free time. Not because they necessarily dislike board games, card games or role playing games, but rather because they likely are more familiar with digital games, due to the easy access many have to them via smart phones, computers or tablets. Teachers who kindly want to respect the interest of their students may therefore prefer to organize learning activities centered around digital games, since they assume their students will like it. Another reason may be that it is easier for teachers to justify for parents and other teachers that students play games during a lesson, if the games are played on electronic devices. Teachers can therefore argue that their students develop some form of digital skills as a bonus while playing. A third reason may be due to logistics – it is likely easier for teachers to have all games stored in digital devices, compared to carrying board game boxes between classrooms, containing plenty of small pieces.

Another similarity between the popular discourse surrounding GBL and the interviewees' answers was the fact that positive arguments and claims dominated, compared to skeptical opinions. Almost every interviewee expressed plenty of advantages of using games for learning purposes. It seemed easier for them to explain what they considered as beneficial of using games, compared to discussing disadvantages. An explanation may be that teachers have been influenced or inspired by arguments that circulate in the popular discourse surrounding GBL, which tend to focus more on advantages and possibilities with games, rather than on problems. As Peterson (2014) argues, the emphasis on advantages tends to dominate in discussions when new educational technologies are made accessible. Although digital games have existed for decades, the introduction of smart phones, laptops and tablets in school during recent years has increased the accessibility of digital games a lot, compared to earlier. Interestingly enough, even the interviewees who had none or barely any personal experience of playing games in their free time or of using GBL in school, still argued for benefits and educational advantages in games, and did not mention any educational disadvantages.

A third similarity between the contemporary debate about GBL and the answers expressed by the interviewees, is that the Swedish school system has something to learn from games. In particular, some interviewees argued that the way education tends to be structured could be improved by using aspects of digital games. Not necessarily should games be used all the time in school, but rather should features from games be implemented in learning activities, so called gamification, as a way to increase the motivation and enjoyment among students. Malone and Lepper (1987) argued in a similar fashion over three decades ago, attempting to understand what it is that makes learning environments intrinsically motivating.

8.6 Limitations of the study

Although the results indicate that certain ideas and views on GBL and educational games exist among the teachers interviewed, the results fail to say anything about how common these arguments are among teachers, in a wider regard. A possible approach could have been to use mixed methods in this thesis, where a quantitative method supplemented the qualitative method, which would also require a much larger sample size of teachers. Potentially the quantitative method could be in the form of a questionnaire, as a way to reach out and collect the opinions from a large pool of teachers. That was however not possible due to time constraints.

As it currently is, three types of teachers have been interviewed - preschool teachers, primary school teachers and upper secondary school teachers – with a low number of interviewees per "category." Although certain patterns in the arguments were found among all the twelve interviewees, regardless of what type of teachers they are, the six preschool teachers in particular seemed to have almost identical arguments and views on educational games and GBL. Due to the diverse sample size, with only a few interviewees per category, it is hard to say whether that is a coincidence or if it just happens to be that preschool teachers overall are more influenced by certain ideas of pedagogy and certain ideas about GBL, than other teachers are. In comparison, only two primary school teachers and four upper secondary school teachers in different subjects were interviewed, which makes it even harder to determine any patterns within each group. A potential approach to explore the arguments within the different categories of teachers, could have been to focus on one or two groups of teachers only, potentially with a somewhat larger sample size. Alternatively, to find an equal number of interviewees per category. That possibility was not considered at the time when the interviews were conducted. Instead the focus was to make sure that teachers from as many sectors of the Swedish school as possible system were represented.

The interviewees heavily emphasized the importance of contextual factors for GBL, such as how teachers use games and how lessons are planned, rather than on the design and the content in games. This might be due to the way the interview questions were formulated, where they generally were very open ended. For instance, the interview questions "What is it that makes a game educational?" and "Are all games educational? Why or why not?" typically generated answers that were not related to how games are designed or what content they contain. That in itself is not necessarily a problem, since it might just be that the interviewees do not view the design as particularly crucial and therefore did not bring it up. A possible approach for focusing the discussion more on the content in games could have been to use more narrow questions, such as: "Is there anything in the design or in the content of games that make them more or less educational"? If so, what and why?" Alternatively, the interview questions could be based on specific educational games that the interviewees themselves have used, to make the interviews revolve around something more concrete.

8.7 Future research

A future area of research may be to more narrowly explore how different categories of teachers – preschool teachers, primary school teachers and upper secondary school teachers – view GBL in relation to their subjects. There are already hints among the raw data in this thesis that indicate differences. For instance, a teacher in geography argued that games are useful for repeating basic facts about countries, while another teacher in social sciences briefly mentioned that games can be a way to illustrate how society functions. It would be interesting to explore what type of subject content different kinds of teachers argue fits to teach via games, what pedagogical ideas they have in mind, and if there are any differences or similarities between their views.

9. Conclusion

In this thesis, twelve teachers in all sectors of the Swedish school system, ranging from preschool teachers to upper secondary school teachers, have been interviewed individually. They have shared their thoughts and reflections about educational games and GBL via vocal interviews, where each interview lasted roughly 30 minutes. Their answers were transcribed and coded via a method called qualitative content analysis, to discern and organize the material into themes, as a way to find similarities and differences in their arguments.

The findings suggest that teachers perceive the boundary between what can be considered to be educational and non-educational games as indistinct and fuzzy. The teachers rarely see that the design of a game can make it more or less suitable for learning purposes. Instead, games are considered to be educational based on how they are used by teachers in educational settings, rather than due to qualities in their design. The most important design feature a game can have, is an open game world, meaning that teachers can adapt the game to fit with whatever learning situations they have in mind, and that students are free to explore, create, solve problems and cooperate while playing. Games should preferably be used to encourage other forms of learning, such as make students experience situations through immersion, and enable authentic learning where exploration and problem solving are encouraged. Additionally, games are useful for repeating basic knowledge and to heavily increase the motivation of students. The downside of using games is related to the contextual factors, in the sense that teachers can use them in thoughtless ways and plan bad lessons around them. The games themselves are not necessarily the problem, instead teachers' wrong usage is.

The findings give insight into how teachers, who proclaim to have a strong interest in and experience of GBL, reason about the educational qualities in games and how to use games in classrooms. The teachers' arguments resemble the arguments and perspectives that are commonly found in the popular discourse – in blogs, in media, in debate articles - that surrounds educational games and GBL. In particular, they are very positive about the usefulness of games in education and seem to expect good benefits for learning.

The findings in this thesis also confirm what is previously known from research about teachers' perceptions of educational games and GBL. The teachers who participated in this study share many of the arguments and perspectives that teachers express in other parts of the world, according to earlier studies. For instance, games are seen as capable of highly motivating students and able to improve their cognitive and social skills, such as problem solving and cooperation.

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Appendices

Appendix 1 – Interview guide

Translated into English

Ethics

- You will be completely anonymous in my thesis
- Your answers will not be published or shown to anyone outside of this research project
- You have the right to leave the interview at any time and you have the right to request that I remove your answers until my thesis is published

Warm-up questions

- What kind of teacher are you?
- Do you have any personal interest in games?

Personal experiences

- Have you ever used games in your class, as a teacher?
- Why did you use that specific game?
- How do you think it worked?
- Do you think your students learned anything?

Views on educational games and game based learning

- What is an educational game?
- Are all games educational? Why? Why not?
- What is it that makes a game educational?
- What are good games to use for educational purposes?

- What do you consider as possibilities and advantages of using games for educational purposes?
- What do you consider as problems and disadvantages of using games for educational purposes?

Appendix 2 – Framework for coding

Category	Sub-category	Definition of the Category	Examples from the interviews	Coding rules
What makes a game educational?	- Depends on design features in games - Depends on how games are used - Games are not educational - All games are more or less educational	Can games be educational? If so, what makes a game educational?	*"I think educational games is a vague term. I would say that there are no educational games."* - Lennart	Look for arguments, claims, and reasons given by the interviewees, if and why they consider games to be educational.
What games are suitable to use for learning purposes?	- Games with an open game world - Other games	Are certain games better to use for learning purposes? If so, why?	*"I think games with an open world are better, where there are no reward systems or any ending."* - Isola	Look for arguments, claims and reasons given by the interviewees, if and why they consider certain games to be suitable to use for learning purposes.
What is seen as meaningful usage of games in education?	- Students' learning - Students' behavior and emotions	What reasons are given for why games should be used in education?	*"Games allow you to experience so much more than you can do in reality."* - Lennart	Look for arguments, claims and reasons given by the interviewees, why they consider games to be useful and meaningful in education.
What are the disadvantages and problems of using games in education?	- How games are used - Social consequences - Problems with the design in games	Are there any disadvantages and problems of using games in education? If so, what and why?	*"There is a risk that pupils consider other things in school boring if they are allowed to play too much."* - Anette	Look for arguments, claims and reasons given by the interviewees, why they consider games to be problematic in education.